

XVII. *The larval habits of the Tineid moth Melasina energa, Meyr.* By J. C. F. FRYER, M.A., F.E.S.

[Read May 7th, 1913.]

PLATE XXI.

THE following notes were suggested by the discovery in a compound, at Peradeniya in Ceylon, of a number of earthy tubes, projecting above the surface of the ground in a manner which at once recalled the tubes of Polychaet worms found on the sea shore at low tide. Further investigations showed that these tubes passed deeply down into the ground and were in most cases without any living inhabitant. Ultimately, however, out of a large number examined, several were found containing the remains of lepidopterous pupae, killed apparently by some fungus, while five were inhabited by what appeared to be Tineid larvae. Two of these died, but the remaining three produced moths, which Mr. Meyrick has kindly identified as females of *Melasina energa*, Meyr. From the same source it is learnt that the larvae of several of the European and African members of the genus are known, and that they construct cases closely resembling those of the Psychidae. The peculiar habits of the larva of *M. energa* therefore seem of sufficient interest to merit a detailed description.

When the larva is full-grown, the tubes measure from 10 to 15 centimetres in length; two-thirds of the tube descends vertically into the ground, while the remaining one-third either lies horizontally on the surface, or winds its way into a mass of dead leaves. The tube is cylindrical in shape and measures from 6 to 8 mm. in diameter throughout its median portion; towards the free end it is funnel-shaped, widening out until at its termination it may measure 12 mm. in diameter. The subterranean end of the tube, when the larva is young, appears to open freely into the earth; in the case of full-grown larvae it widens considerably, thus forming, as will be shown subsequently, a pupal cell.

In composition the tube is built of a strong, closely woven silk, to the outside of which grains of earth, pieces of dead

leaf and broken twigs are attached, the earth covering the subterranean portion, while the dead leaves and twigs encrust that above ground.

The pupal cell is formed by the terminal 2 cm. at the bottom of the tube and differs from the remainder in its greater width and in the increased thickness of its silken walls. Inside the pupal cell lies a thin cocoon which is cylindrical in shape and flat at each end; it is peculiar in that it is composed of fine silk matted together by some dark-coloured secretion, thus resembling the cocoons of certain Hymenoptera. This cocoon fits fairly closely into the pupal cell, but for the greater portion of its length is only loosely attached to it by a few strands of silk; at the extreme lower end, however, it is firmly woven to the lower lips of the cell so that the flat end of the cocoon entirely blocks the subterranean entrance. This arrangement seems peculiar for, while the walls of the pupal cell are very thick, the end is guarded solely by the thin flat silken disc which forms the bottom of the cocoon. The similar disc, which forms the upper end of the cocoon, is easily detached and on the emergence of the moth is pushed up like the lid of a box. In the few cases examined the empty pupa skin was found in the cocoon.

The food of the larvae consists of dead leaves and other decaying vegetable matter, though in captivity they never seemed entirely satisfied with the food of this nature which was given them; they did not desert their original tubes, but showed dissatisfaction by constructing branch tubes on the surface of the earth, a proceeding never observed under natural conditions. Feeding was accomplished only by night, and it was practically impossible to watch the larvae at work, as they retreated immediately on the approach of a light; they were never found away from their tubes and probably never leave them, since the five captured larvae, when removed from their dwellings, were unable to crawl on a flat surface and could not regain their tubes without assistance.

No suggestion can be made as to the precise reasons which have brought about this strange modification of the tube-building habit; there are certain obvious advantages, such as freedom from the attacks of birds and parasites, but there are also serious disadvantages in the very small area which is available as a feeding-ground and the extreme liability to fungoid diseases, a serious consideration in a

damp hot climate such as that of Peradeniya. From the evolutionary point of view it appears probable that to make some simple form of tube is ancestral in the genus, and that this habit has developed on the one hand into that of making a case, or portable tube, and on the other of building an elaborate fixed structure such as that just described.

This account may be concluded by a short description of the larva itself, taken from one supposed to be full grown.

The head is ovate in shape and is so attached to the first thoracic segment that the anterior surface is directed upwards, bringing the mouth forward; in colour it is dark brown with the surface finely shagreened.

The first thoracic segment is elongated and in front is slightly broader than the head but behind is markedly constricted; its surface is chitinous, brown in colour and finely shagreened, this latter feature being less evident than in the case of the head.

The remainder of the body is cylindrical, tapering slightly posteriorly; in colour it is greenish-grey, lighter ventrally; hairs are present but they are sparsely scattered and are very minute.

The legs are brown in colour, rather long, and directed forward. The prolegs are very short and are armed with a series of broad hooks, the suckers being hardly functional. The spiracles are brown, those on the penultimate segment being large and conspicuous. Length 23 mm.

EXPLANATION OF PLATE XXI.

FIG. 1. *Melasina energa*, Meyr. Bred.

2. Diagrammatic representation of a tube of *M. energa*, to show its position in the ground.
3. Section of a tube of *M. energa*, showing (a) general shape of tube, (b) cylindrical cocoon lying in the widened lower end of tube, described as "pupal chamber," (c) method of blocking subterranean entrance by means of the disc forming the lower end of the cocoon.
4. Photograph of a tube, somewhat shrivelled and torn, of *M. energa*.

[Figures 1, 3, 4 are approximately natural size.]